These properties are for everyday math.

An **inverse** for a particular operation is the number that returns the identity.

|  |  |  |  |
| --- | --- | --- | --- |
| **Additive inverse** | **a + (-a) =0** | 7 + (-7) =0  -7 is the additive inverse of 7 | The additive inverse is the negative of the number. |
| **Multiplicative inverse** |  | 3 x 1/3 = 1 | The multiplicative inverse of a rational number is it’s reciprocal. |

3x(4x)=3(4)xx=12x2 using both the commutative and associative properties of multiplication.

|  |  |  |  |
| --- | --- | --- | --- |
| **Distributive property** | **a(b+c)=ab+ac** |  | Multiplying a sum by some number is the same as multiplying each term by that same number. |

**Exponent Rules:**

|  |  |
| --- | --- |
| Rule: | Example: |
| *A-k =* 1/*Ak* | 2-3 = 1/(2×2×2) = 1/8 |
| *Ak*×*An* = *A*(*k*+*n*) | 32×33 = (3×3) × (3×3×3) = 3×3×3×3×3 = 35 |
| *Ak*/*An* = *A*(*k*-*n*) | 32/33 = (3×3) / (3×3×3) = 1/3 = 3-1 |
| (*Ak*)*n* = *A*(*k*×*n*) | (32)3 = (3×3) × (3×3) × (3×3) = 3×3×3×3×3×3 = 36 |

**Digging for Roots:**

If you want to have your calculator take the square root of something it’s pretty straightforward once you’ve found the  button. Taking higher roots of a number, however, often require that you know the rule illustrated below.



Example: For the cube root of 125 - you could plug the following into your calculator:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 125^(1/3) | [enter] | **OR** | 125^(0.3333) | [enter] |
| = 5 |  | = 5 |  |

**Factoring**

Assume 12x+6 is the result of distribution. What did it look like before the distribution was done?

There was something outside a set of parenthesis and two terms inside the parenthesis.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ( |  | + |  | ) |
|  |  |  |  |  |  |
| 6 | ( | 2x | + | 1 | ) |

Separating an expression so that the smallest possible pieces called factors multiply together to get the original expression is called **factoring**.

Look at each term and find the largest factor that is in all terms.

Example: Find the largest number that divides evenly into 72, 60 and 36.

|  |  |
| --- | --- |
| This number goes in front of the parenthesis.  Divide each term by the common factor. |  |
| Fill in the positions in the parenthesis. Distribute to check the factoring. | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 12 | ( |  | + |  | + |  | ) | |  |  |  |  |  |  |  |  | | 12 | ( | 6x2 | + | 5x | + | 3 | ) | |

 The largest factor in all terms is 8xy. When the division is done there shouldn’t be any negative exponents. Notice the negative in the third term.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Divide each term by the common factor. | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 8xy | ( |  | + |  | - |  | ) | |  |  |  |  |  |  |  |  | | 8xy | ( | 3xy | + | 2x | - | 7y | ) | |
| The division can be done in your head, but some students need to write it down. | |

CHALLENGE:

|  |  |
| --- | --- |
| Hint: Factor out a ¼. |  |